

6—1 Proportions

Ratio—compares two quantities

$$a:b$$

$$\frac{a}{b}$$

Example

1860 students

310 athletes

Athlete: student ratio

$$\frac{310}{1860} = \left[\frac{1}{6} \right]$$

Athlete: non-athlete ratio

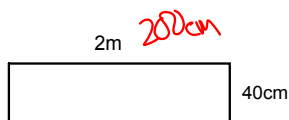
$$310:1550 \quad (1:5)$$

Must convert to the same unit!

K H D Base D C M

meter

2m



L:w

$$\frac{200}{40} = \left(\frac{5}{1} \right)$$

Simplify

2 ft : 20 in

$$\frac{24}{40} = \left(\frac{6}{10} \right)$$

12 ft : 5 yd (3ft = 1yd)

$$\frac{12}{15} = \left(\frac{4}{5} \right)$$

The ratio of 2 supplementary angles is 4:5.
What are the measures of the angles?

$$4x + 5x = 180$$

$$\begin{aligned} 4x &= 80^\circ \\ 5x &= 100^\circ \end{aligned} \quad \begin{aligned} 9x &= 180 \\ x &= 20 \end{aligned}$$

The ratio of the angles in a triangle are 2:3:4.
What are the measures of the angles?

$$2x + 3x + 4x = 180$$

$$x = 20$$

$$40^\circ \quad 60^\circ \quad 80^\circ$$

The ratio of the sides of a triangle are 5:12:13.
The perimeter is 90 cm. What are the lengths of the sides?

$$5x + 12x + 13x = 90$$

$$30x$$

$$x = 3$$

$$15\text{cm}$$

$$36\text{cm}$$

$$39\text{cm}$$

Do:

1. The ratio of the angles in a triangle are 1:5:6.
Find the angles.

2. The ratio of the angles in a triangle are 3:5:7.
Find the angles.

Proportion—equation stating 2 ratios =

$$\frac{a}{b} = \frac{c}{d}$$

Cross Mult $ad = bc$

$\overset{\text{means}}{\text{a is to b as c is to d}}$
 $\underset{\text{extremes}}{\text{a is to b as c is to d}}$

Product of Means = Product of the extremes

Examples

$$\frac{6}{18.2} = \frac{9}{y} \quad 6y = 9 \cdot 18.2$$

$$\frac{\cancel{6}^1}{3 \cdot \cancel{9}^1} = \frac{\cancel{9}^1}{y} = \frac{18.2}{y}$$

$$\boxed{27.3 = y}$$

$$\frac{4x - 5}{3} = \frac{-26}{63}$$

$$6(4x - 5) = 3 \cdot (-26)$$

$$24x - 30 = -78$$

$$24x = -48$$

$$\boxed{x = -2}$$

HW

p285-286

#s 12-25 all, 29-35 odd